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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/917,325	07/27/2001	Jonathan D. Albert	INK-097 (2108/49)	1236
21323	7590	05/11/2004	EXAMINER	
TESTA, HURWITZ & THIBEAULT, LLP HIGH STREET TOWER 125 HIGH STREET BOSTON, MA 02110			EISEN, ALEXANDER	
			ART UNIT	PAPER NUMBER
			2674	8

DATE MAILED: 05/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/917,325

Applicant(s)

ALBERT ET AL.

Examiner

Alexander Eisen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 7-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 13-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

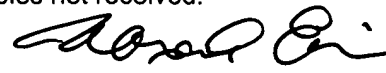
Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.


ALEXANDER EISEN

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. In response to the previous Office action Applicant has amended independent claim 1 and added new claims 13 through 20. Claims 7-12 have been withdrawn as non-elected.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 6 and 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over DiSanto in view of Hayashi (both references are references of record).

DiSanto discloses a mounted electrophoretic display assembly (FIG. 1), comprising a substrate (glass panel 2); an electrical connection (FIGS. 2 and 4) formed on the substrate (97 and 98 in FIG. 2 and 110 and 112 in FIG. 4) and having a first (part of the conductors 97 and 98 delineated by dashed lines 18 or 20) contact pad and a second contact pad (106, 108 in FIG. 4); an electrophoretic display element in electrical communication with the second contact pad (col. 5, lines 53-61); a control circuit (80) mounted on the flexible substrate and in electrical communication with the second contact pad for controlling how the display element is addressed through the electrical connection, the control circuit being co-located with and spaced from the display element on the substrate.

DiSanto does not disclose that electrophoretic display element is capable of flexing without substantial detriment to its optical performance or that the display assembly is capable of flexing without substantial detriment to its optical performance.

Hayashi teaches a flexible electrophoretic display structure (FIGS. 1, 3 and 17), wherein the display is assembled on a flexible substrate and the whole display assembly is capable of being folded; and wherein all control components, battery and driver circuits are integrally mounted onto the flexible substrate (see col. 7, lines 14-50; col. 25, lines 44-54). Hayashi also teaches that depending on the intended use the substrate can be made of glass, PET, paper or metal. Since the whole display assembly can be folded it is understood that this can be done without detrimental effect to its optical performance.

It would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify the display of DiSanto so as to substitute the glass substrate of DiSanto with a flexible sheet-like substrate of Hayashi, because it would allow making a paper-like display with high breaking strength along with easy and safe manufacturing (Hayashi; col. 4, lines 20-33), wherein the display can be formed by integrally assembling a display element and electronic function components for driving the display (col. 7, ll. 14-24) while eliminating wiring, molding and packaging members necessary for connection of elements and circuits.

As to claim 6, both the control circuit 80 in DiSanto and control circuit 842 in Hayashi comprises an electrophoretic display driver.

As to claims 15 and 16, Hayashi teaches that the electrophoretic display element comprises a first electrode 16b (FIG. 2A; col. 10, ll. 33-40), an electrophoretic display medium 15, and a second electrode 16a, wherein the second electrode can be shared across the plurality of electrophoretic display elements (FIG. 3B; col. 10, ll. 59-67).

With regard to claims 17 and 18 DiSanto teaches that the control circuit comprises integrated circuit (col. 6, ll. 6-11) and a driver chip.

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As to claim 19, DiSanto further teaches that the control circuit comprises an interface chip (col. 7, ll. 44-50).

As to claim 20, the control circuit comprises a control chip (col. 6, ll. 11-21; see also Hayashi; col. 9, ll. 23-31).

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over DiSanto in view of Hayashi and further in view of Higgins, III, ("Higgins"), US 5,492,863.

DiSanto-Hayashi does not teach that the control circuit is connected to the second contact pad with a curable, electrically conductive thermoset.

Higgins teaches a method for forming conductive bumps (24 in FIG. 7) on a semiconductor device (12) for connecting circuit pad (32) with microchip pad (14), wherein conductive polymer, curable by heat is used for the bumps (col. 3, lines 17-46; col. 8, lines 28-38).

It would have been obvious to one of ordinary skill in the art at the time when the invention was made in view of Higgins to connect the control circuit to the second pad in the display of DiSanto modified by Hayashi with curable electrically conductive thermoset, because it reduces the cost of manufacturing (Higgins; col. 3, lines 42-50), while allowing formation of small pitch bumps.

5. Claims 3, 4, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over DiSanto in view of Hayashi and further in view of Parker, US 6,369,793 B1.

DiSanto discloses a mounted electrophoretic display assembly and Hayashi teaches a flexible electrophoretic display structure. Hayashi further teaches making electrical conduction

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connection by printing (silk-screening) using silver paste (col. 15, ll. 20-23) but stops short of calling it ink.

None of the above teaches electrical connection realized by conductive ink.

With regard to claims 3 and 4 Parker teaches printable electrophoretic display, wherein the connection between the display and control and power-supplying components is realized by printing using conductive ink or paint (FIGS. 1-4; col. 3, ll. 42-60; col. 4, ll. 3-12 and 29-35).

It would have been obvious to one of ordinary skill in the art at the time when the invention was made to use conductive ink printing techniques taught by Parker in the display of DiSanto-Hayashi, because it lends itself conveniently for use in the paper sheet-like display of the latter, wherein the conductors are silk-screened or printed using silver paste, while it would be readily recognized by those of ordinary skills in the art as an alternative choice of material for electrical connections.

As to claim 13, Parker also teaches using conductive ink, which can be carbon or silver in nature (col. 4, ll. 29-35).

As to claim 14, Parker further teaches using a protective film layer over the contact layer, the purpose of which is self-explanatory (col. 4, ll. 58-60).

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over DiSanto in view of Hayashi and further in view of Chan et al., ("Chan"), US 5,660,570.

DiSanto discloses a mounted electrophoretic display assembly and Hayashi teaches a flexible electrophoretic display structure.

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None of the above teaches the control circuit is connected to the second contact pad by being removably mounted in a control circuit carrier that is in electrical communication with the second pad.

Chan teaches integrated circuits that are placed into a socket rather than being soldered onto printed circuit themselves (col. 5, line 63 - col. 6, line 15).

It would have been obvious to one of ordinary skill in the art at the time when the invention was made that in view of Chan the driver circuits of DiSanto can be placed into chip carriers rather than be soldered onto a printed circuit board, because it will allow replacement of a chip, in case of damage or upgrading, much easier without requiring to de-solder it from the board (Chan; col. 6, lines 4-10).

Response to Arguments

7. Applicant's arguments filed on 29 April 2004 have been fully considered but they are not persuasive.

Applicant argues that the rejection of the independent claim 1 over DiSanto in view of Hayashi cannot be sustained because combining the two to practice the claimed invention is improper. "DiSanto does not teach or suggest flexibility in the substrate. Nor does it teach the overall flexibility of the display assembly. On the other hand, Hayashi teaches away from the configuration recited in amended claim 1, which requires that the control circuit be co-located with and spaced away from a flexible display element"[sic]. Examiner respectfully disagrees. On one hand, DiSanto teaches the configuration recited in amended claim 1, which has the control circuit co-located with and spaced away from the display. Therefore, Hayashi does not require to teach this combination again. The motivation for modifying DiSanto in view of Hayashi, alleged

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by the examiner as obvious to those of ordinary skill in the art at the time of the invention, has the advantage of making the display flexible (“capable of being folded”; col. 7, ll. 28-37), with high mechanical strength, while simple in manufacturing (“formed by integrally assembling a display element and electronic function components for driving the display”; col. 7, ll. 14-24), and not in location of the control circuits. On the other hand, control circuits in Hayashi, are also “co-located” on the same laminated substrate and spaced apart from the display elements (see FIG. 17A).

Applicant also argues that Hayashi “teaches away from spacing the control circuit away from the display element, i.e. in a co-location configuration, to preserve overall flexibility of the display assembly”. In support of this statement Applicant recites Hayashi, column 5, lines 13-29, wherein Hayashi teaches “several advantages of its stacking configuration, including the elimination of wiring members necessary for connection of elements and circuits and molding and packaging members necessary for connection of elements and circuits”. Examiner respectfully disagrees. Applicant’s excerpt is taken out of context. The meaning of the above is not eliminating of connections between various functional components or members of the display device, but elimination of such in conventional display assembly arrangement, when all components comprise discrete members. Contrary to that, Hayashi teaches integrated display device, where all such components are incorporated (integrated) into a single sheet and therefore the assembly is greatly simplified (Hayashi; col. 5, lines 6-12). As to “teaching away”, there is no evidence that Hayashi explicitly teaches that it would be detrimental to flexibility of the display to position the control circuits on either side of the substrate, i.e. against “co-locating” circuits with flexible display element. Applicant asserts: “co-location permits manufacturing of a

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flexible panel display”. It should be noted thought that Hayashi also discloses manufacturing of a flexible panel display and its control circuits and the display elements are co-located in the same sheet as was discussed above.

Applicant further argues that DiSanto describes metalized solid row and column conductors placed on a glass substrate and therefore they are presumably solid and inflexible. “Therefore, even if following the Office action’s suggestion, a flexible substrate is substituted for the glass substrate in DiSanto, the resulting display is still not capable of flexing without substantial detriment to its optical performance. Indeed, flexing such a modified display may damage or break the metalized conductors, rendering the modified display inoperable”[sic]. Examiner respectfully disagrees. While DiSanto teaches metalizing portions of ITO conductors for receiving IC chips (col. 5, ll. 14-27; col. 6, ll. 57-64; see also col. 9, ll. 2-5), the conductors are made of very thin indium-tin-oxide (ITO) layer, which is flexible. On the other hand, when DiSanto is modified by substituting substrate with that of Hayashi’s, it would have been obvious to one of ordinary skill in the art at the time when the invention was made that the wiring, taught by Hayashi, i.e. printing by silk-screening using silver paste, would be also adaptable for use in such modified display, and therefore would render that wiring flexible.

The rejection of claims 1-6 and 13-20 is maintained.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Eisen whose telephone number is (703) 306-2988. The examiner can normally be reached on M-F (8:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard A. Hjerpe can be reached on (703) 305-4709.

Any response to this action should be **mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9306 (for Technology Center 2600 only).

Hand-delivered responses should be **brought to:** Crystal Park Two, 2121 Crystal Drive, Arlington, Virginia, Sixth Floor Receptionist.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be **directed to:** Technology Center 2600 Customer Service Office, whose telephone number is (703) 306-0377.

A handwritten signature in black ink, appearing to read "Alex Eisen".

Alexander Eisen

May 7, 2004